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GEOLOGY AND PALÆONTOLOGY.

A New Genus of Rhinocerontidæ.—While the genus *Aphelops* must be regarded as the direct ancestor of the recent rhinoceroses with canine and incisor teeth, now confined to Asia and the Islands; the ancestral genus of the African forms and their extinct congeners, which are without the teeth named, is less known. It can now be shown that the missing genus inhabited North America, and that like *Aphelops*, it is hornless. It may be named and characterized as follows: *Peraceras* Cope; superior dentition; I. 0; C. 0; P-m. 4; M. 3; nasal bones weak, hornless.

This genus is established on a new species recently discovered by Mr. R. H. Hazard, in the Loup Fork formation of Nebraska, which may be called *Feraceras superciliosus.* It is founded on a nearly perfect skull, which lacks the lower jaw. Its size is about that of the Indian rhinoceros. It is narrowed anteriorly, but is very wide between the orbits. Posterior to these it contracts rapidly, and rises to a rather elevated occiput. Saggital crest narrow; a prominent angle above each orbit. The premaxillary bone is narrow and weak. The nasal notch extends to above the middle of the third superior premolar. The occiput is rectangular in outline, with truncate summit. Its surface above is concave, divided by a strong median crest; lower down a vertical groove intersects its lateral border. The crests of the molar teeth are rather simple, and the posterior notch is soon isolated on attrition. Wear also isolates an external median fossa of the second premolar. Length of skull from end of premaxillary bone to condyles, M. 700; length of alveolar border of premaxillary, .025; length of molar series, .315; length of three true molars, .160; width of crown of second true molar at base, .075; superciliary width, .255.

This species is nearest to the *Peraceras malacorhinus*, a species which I formerly referred to *Aphelops*, but which I have little doubt belongs to the present genus. It differs from *P. superciliosus* as follows: In the latter species the front is wider, and is plane or concave, not convex; the superior edge of the maxillary is not wide and incurved, and has not the oblique ridges; the infraorbital foramen consequently has a more lateral opening. The nareal notch does not extend so far posteriorly by the one and a half molar teeth. The occiput is wider, is divided by a median crest not found in *P. malacorhinus*, and has the vertical lateral grooves much shorter. The acute supraorbital angle is not seen in the *P. malacorhinus.*

The rhinoceroses of the Loup Fork formation whose generic position can now be ascertained, are the following: *Paraceras malacorhinus; P. superciliosus; Aphelops meridianus; A. megalodus; A. fossiger.—E. D. Cope.*

THE GEOLOGY OF SOUTHERN ARIZONA.—Prof. E. T. Cox writes us from Tucson, Arizona, as follows: The oldest sedimentary rocks that I have seen in this part of the Territory are limestones, that contain fossils in the same layer, of coal measure, Sub-carboniferous, and Devonian species: *Productus cora*, *P. semireticulatus*, *Spirifer lateralis?* *Zaphrentis* sp.? *Atrypa reticularis*, and *Heliophyllum halli?* I am inclined to place the entire limestone group as Sub-carboniferous. The rock is, wherever seen, semicrystalline, and the fossils are very imperfect and few in number. The oldest and most persistent crystalline rock is coarse grained granite, which is readily disintegrated by atmospheric influences, and the débris mixed with fragments of the superimposed serpentine trap, basalt, porphyry, and trachites, form the mesa and valley lands of the country, and gives rise to a remarkable topography. The mountains are in low, short and narrow ranges, that seem to rise from the intervening mesas, like islands in an ocean. Where porphyry or green stone form the principal mountain rocks, they are traversed in all directions by quartz lodes or veins, that present bold crops, and in very many instances may be traced for many miles in length. These lodes are never free from ores of precious metals and in some localities the ores are sufficiently abundant to pay handsomely for mining. The Tombstone mines are now about the best paying mines on the Pacific slope. At the latter locality, granite forms the northern border of the low mountains of this precious *graveyard*. The granite is followed on the south by crystalline sub-carboniferous limestone, and the latter by quartzite and porphyry. The limestone appears to be a great mineralizer, and we generally find in it, pockets of the richest ores, assaying from $200 to $10,000 and more, in gold and silver, per ton of 2000 pounds. In localities where limestone forms the prevailing mountain rock, we find numerous and rich deposits of carbonate and sulphurets of copper, cupriferous silver, argentiferous galenite and cerrusite. All the important copper and lead ores that I know of, in Pima county, are found in the sub-carboniferous limestone or at the junction of the latter with crystalline rocks.

The cone-shaped mountains are capped with trachite, which alternates with basalt and trap, and sometimes an amygdaloid-like stone, always honeycombed, as though the once imbedded crystals had weathered out. You will also find on such mountains large beds of calcareous tufa, though not a trace of water can now be found anywhere in the vicinity, evidences of springs long since dried up. On the desert Mesas, between here and Yuma, I find imbedded in the sand and granite gravel, and forming a solid inlaid pavement, perfectly smooth pebbles of trap and basalt, that are polished as smooth as glass, are as black as tar, and glisten as though they had been japanned. Though all are finely glazed, some are covered with little pits. The polishing is done by the drifting sand, and the black glaze is produced by the action of the hot sun on the oxide of iron, which must be partially reduced to the metallic state. The heat of the sun on the rocks on this mesa will reach fully 150° F. for some months, each year, and must produce a powerful effect on the physical character of the rocks. Indeed I am satisfied that if our sedimentary rocks were subjected to strong solar heat and moisture for a period of time, they would be completely metamorphosed. The mesas in this part of Pima county, range from 2000 to 3000 feet above sea level, and the highest mountains are from 8000 to 9000 feet above the sea. The timber on the mesas is locally mesquite, cats' claws (a species of mesquite) and palo verde, and a shrub called by the Mexicans Edonella. At an elevation of 4000 to 5000 feet, we find scrub oak, and 7000 to 8000 feet pine. These elevated regions come within the range of prevalent dew falls. While on the mesas dew is seldom or never seen.

GEOGRAPHY AND TRAVELS.[1]

THE VOYAGES OF THE WILLEM BARENTS AND THE ISBJORN IN THE BARENTS SEA.—The year 1879 will always be memorable in the record of Arctic exploration for the discovery of the Northeast passage by Nordenskiöld, of whose successful voyage accounts have been given in former numbers of the NATURALIST. He has now returned to Europe and been received with great honors at the various cities he has visited on his way to his northern home.

Other less important but still remarkable voyages into the Arctic seas were also made during the last summer.

In the NATURALIST for November, 1879, we noticed the sailing of the Dutch North Polar Expedition in the schooner *Willem Barents*, and of Capt. A. H. Markham in the yacht *Isbjorn*. Both having returned, an interesting account of their voyages prepared by Capt. Markham has been read before the Royal Geographical Society.[2]

The *Willem Barents* found the edge of the pack ice on July 5, in lat. 75° 30′ N., long. 26° E. After stopping at Vardö, the explorers took many deep sea soundings and serial temperatures and obtained dredgings in the Barents sea, arriving in the Matyushin Shar on August 6th. On the 18th they met the *Isbjorn*, and on the 20th they sailed northwards together along the west coast of Novaya Zemlya, soon separating not to meet again. The *Willem Barents*, after placing a memorial stone at Cape Nassau, took a northward course unobstructed by ice on the 54th meridian, and on September 7th they sighted high land, supposed to be Mount Brunn on MacClintock's island, Franz Josef Land, distant about sixteen miles. A broad belt surrounded the land, and the weather being threatening they turned back and arrived safely at Hammerfest on September 24th.

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[1] Edited by ELLIS H. YARNALL, Philadelphia.

[2] Proceedings of the Royal Geographical Society, January, 1880.